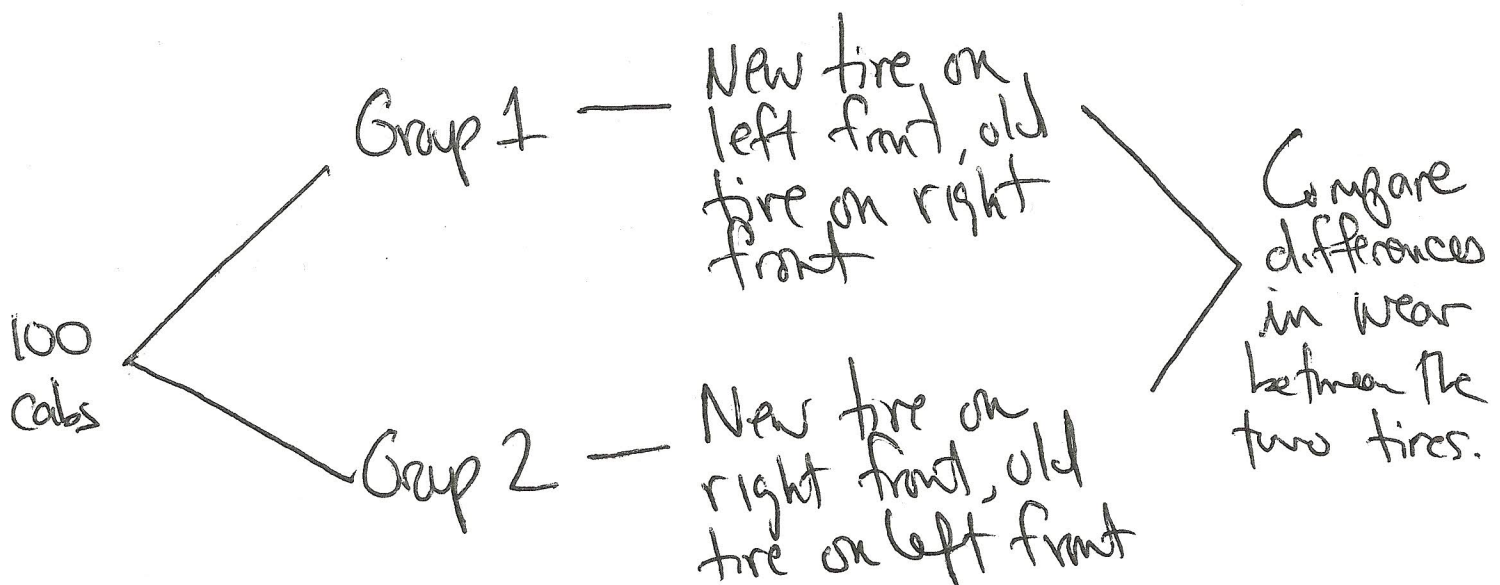


1. A U.S. government researcher wants to select a sample of tax returns that will include returns from a variety of different income levels. He divides the set of all the different incomes shown on the forms into 10 nonoverlapping ranges, then he randomly selects 100 tax returns from each. Which of the following best describes the sampling scheme used in this example?
- a. Stratified random sample
 - b. Simple random sample
 - c. Convenience sample
 - d. Two-stage sample
 - ☒ e. Cluster sample
- or multistage*
2. In a very large table of random digits, which is true?
- i. At some point in the table the sequence of digits 00 will occur.
 - ii. The sequence 999 is less likely to occur than the sequence 276.
 - iii. Two consecutive rows will never start with the same digit.
- ☒ a. I only
 - b. II only
 - c. III only
 - d. I and II
 - e. II and III
3. The principal of a rural school is trying to see how much faculty support she has for her proposal to lengthen the school year from 180 days to 220 days. She places surveys in the faculty mailboxes of all 100 teachers. The principal receives 40 surveys back—38 saying that they oppose the proposal. Based on this survey, the principal decides that her proposal does not have enough faculty support. Which of the following is the most significant source of bias?
- a. Undercoverage
 - b. Response bias
 - ☒ c. Nonresponse bias
 - d. Sampling error
 - e. Overcoverage
4. An opinion survey is going to be conducted at two colleges. College A has 5000 students and College B has 20,000 students. Each survey will be conducted with a simple random sample of 200 students. The results from each survey will be used as an estimate for the opinions of the student body at each college. Which college is likely to have its students' opinions estimated more accurately by the survey?
- a. College A since it has a larger percentage of its students surveyed.
 - b. College A since the larger school is likely to have more diversity of opinion.
 - ☒ c. Neither college is more likely to have a more accurate estimate.
 - d. College B since the students with out-of-the-mainstream opinions will have less of an influence on the average student opinion at a larger school.
 - e. College B since there is less sampling variability with a larger population.

5. A recent experiment tested the idea that "Baby Newton" videos helped infants with their letter recognition abilities. The experiment was a well designed randomized comparative experiment. After the researchers analyzed the results, they published their results in a journal, concluding that "the subjects who watched the *Baby Newton* videos were able to correctly identify a string of 4 letter 35% of the time; whereas the control group were able to correctly identify a string of 4 letters 32% of the time. These results were statistically significant, with a p -value <0.05 ". This means that
- ☒ a. the difference between the two groups (video watching vs. control) was too large to be explained by chance variation and that the difference is due to watching the video.
 - b. There is not real difference between the two groups (video watching vs. control).
 - c. The difference between the two groups (video watching vs. control) is small and therefore insignificant—indicating that the findings are important for researchers.
 - d. The results can be replicated.
 - e. There is no bias and that we can accept the results, which show that the videos were no more effective in helping infant recognize letters than just letting the infant learn letter recognition the "traditional way".
6. Which of the following explains why large sample tend to provide more reliable information about a population than small samples?
- a. The response variable will be measured more effectively.
 - b. There is a smaller probability of bias.
 - c. It will be less of a problem if the randomization is imperfect.
 - d. Large samples are more diverse.
 - ☒ e. Large samples show less sampling variability.
7. David knows that dancers are trained to spin many times without losing their ability to move in a straight line after spinning. He wonders whether this ability is dependent on the number of spins. He wants to design an experiment that will compare the ability of experienced female dancers to walk a fixed distance in a straight line after 5 spins with their ability to walk the same straight line after 10 spins. Which is the most appropriate design for this experiment?
- a. Completely Randomized Design
 - b. Stratified Design
 - c. Randomized Block Design
 - d. Cluster Design
 - ☒ e. Matched Pairs Design
8. Which is NOT a valid reason for blocking when designing an experiment?
- a. Blocking controls the effects of an outside variable by bringing that variable into the experiment to form the blocks.
 - b. Blocking allows the researcher to isolate variability due to a factor other than the explanatory variable under investigation.
 - c. Blocking can diminish confounding.
 - ☒ d. Blocking reduces the need for replication.
 - e. Blocking reduces variation.

9. If an experiment is double-blind, it means that . . .
- the subjects do not know if they are part of the experiment and they do not know if they are able to discuss the result with anyone.
 - the researchers are not permitted to tell the subjects if they are getting the actual treatment or the placebo.
 - ☒ neither the subject, nor the experimenter knows who is getting the actual treatment and who is getting the placebo.
 - some subjects are getting the "regular" dose of the treatment, while others are getting a "double" dose and the subjects are unaware of which treatment they are receiving.
 - the bias has been eliminated by blocking when the subjects were not randomly selected.
10. A manufacturer of tires wants to conduct an experiment with a new type of tread design. This tread is supposed to last longer in hot climates than the existing tread design. The tire company wants to conduct the experiment in Phoenix, Arizona, during the months of April through September. One hundred taxicabs will be used in the experiment, and only the front wheels will have the new tires. Design an experiment to determine if the new type of tire will last longer than the existing tire.



This is technically considered a matched pair block design - even though randomization is 1st step - technically, you are blocking the cabs based on where the new tires are. Also, when you compare, you are really just comparing w/in each block to see if there is a difference & then, if desired, you can compare between the two groups.